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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|-----------------------------|------------------|
| 09/971,095 | 10/03/2001 | Igal Ladabaum | 016132 0274779 SC-007(U) | 2110 |

7590 12/17/2002
Pillsbury Winthrop, LLP
1600 Tysons Boulevard
McLean, VA 22102

EXAMINER

LOBO, IAN J

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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3662

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/971,095

Applicant(s)

LADABAUM ET AL.

Examiner

Ian J. Lobo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 9-18 and 27-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 19-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8 and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of the patents to Ladabaum et al ('351, '452, '709), Haller et al ('476, '832) or article Ladabaum et al when taken in view of Horner et al ('652) and Swierkowski ('580).

The prior art Micromachined Ultrasonic Transducers (MUTs) are adequately disclosed in the patents to Ladabaum et al, Haller et al or article to Ladabaum et al. Specifically, the MUTs include a plurality of MUT cells located on a first surface of a substrate (silicon). The instant claims are directed to micromachined ultrasonic transducer structures.

The difference between claims 1 and 19 and the above noted MUTs is the claim specifies a damping material located on the backside of the substrate.

The patent to Horner et al teaches that it is well known to utilize acoustic backing or damping materials to attenuate or absorb noise or reverberations in ultrasonic transducers. Some of the acoustic absorbers or dampers include elastomers, silicon rubbers and RTV materials. Swierkowski discloses a micromachined device (not unlike

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the MUTs disclosed above) where a substrate (10) is abutted with acoustic damping or absorption layer (46).

Thus, in view of Horner et al and Swierkowski, one of ordinary skill in the art would look to modify the prior art MUTs by disposing an acoustic absorbing or damping material on the backside of the substrate from the capacitive elements since such a damping layer would attenuate echo reverberations. Claims 1 and 19 are so rejected.

Dependent claims 2-8 and 20-26 are further provided by the above noted combination of prior art.

Response to Arguments

3. Applicant's arguments filed October 21, 2002 have been fully considered but they are not persuasive.

In response to applicants argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The prior art MUTs are a specific type of ultrasonic transducer wherein ultrasonic waves are transmitted and/or received along a specific front radiative surface or edge of the transducer. The secondary reference to Horner et al (col. 1, lines 17-32)

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teaches that ultrasonic transducer structures suffer from noise or reverberations or interfering waves traveling along surfaces edges other than those used for transmission and/or reception. Horner et al suggests utilizing acoustic absorption layers or acoustic absorption materials adhered to the surfaces or edges other than the transmission and/or reception surface or edge. Such an absorption layer or material would effectively attenuate such reverberations or noise. Swierkowski teaches that adhering an acoustic absorption layer or material to the surface of the substrate other than the radiative surface (backside) is known. Thus, in view of Horner et al, it would have been obvious to a skilled artisan in the field of ultrasonic transducers to modify the prior art MUT's by adhering an absorption layer or material to the surface of the substrate other than the radiative surface so as to attenuate the noise or interfering waves are common in ultrasonic transducers, of which MUTs are part of. Such a modification would be one of ordinary skill since Swierkowski teaches that micromachined ultrasonic transducers (MUTs) are known where the substrates are adhered to an absorption layer or material.

Further, applicants argue (last two lines of page 3) that the effectiveness of their solution "has been demonstrated with experimental data". It is pointed out that such data has not been presented in the instant application and as thus, this argument is not convincing.

Applicants further argue that at the time of the invention, acoustic damping for specific substrate modes in MUT's was not contemplated because such substrate modes were not known to exist and such their damping, not contemplated. However, it is argued that, with respect to claim 1 and the above noted rejection, the use of a

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damping material or acoustic absorption material on the surface other than the radiative surface, would inherently suppress "substrate acoustic modes". ^{MUT's are a type of growing + reverberation} Further, with respect to claim 19, in as much as substrate acoustic modes are a form of noise or reverberations or interfering waves traveling along surfaces edges other than those used for transmission and/or reception (as noted and disclosed in the prior art of record), it is obvious to one of ordinary skill in the art that the modification of the prior art MUT's (absorption layer on the surface other than the radiative surface) would suppress substrate acoustic modes since they are a form of noise or interference.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

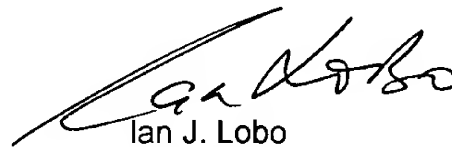
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian J. Lobo whose telephone number is (703) 306-4161. The examiner can normally be reached on Mon - Fri, 6:30 - 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (703) 306-4171. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9326 for regular communications and (703) 872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.



Ian J. Lobo
Primary Examiner
Art Unit 3662

December 16, 2002